Claims

1. A magnesium die casting system comprising: a casting furnace for producing molten magnesium alloy, a pump for transferring the molten magnesium alloy, and a die casting machine having a shot sleeve for receiving the molten magnesium alloy, the shot sleeve adapted for filling from the underside thereof.
2. The magnesium die casting system of claim 1, wherein the shot sleeve includes sealing means between the shot sleeve and an underflow filling tube.
3. The magnesium die casting system of claim 1, wherein the molten magnesium is transferred at a flow rate and wherein the flow rate is modulated according to an algorithm
4. The magnesium die casting system of claim 1, wherein the shot sleeve is heated.
5. The magnesium die casting system of claim 1, wherein the shot sleeve comprises gas flow ports.
6. A magnesium die casting system for in-line recycling of scrap magnesium, the system comprising a re-melt furnace in fluid communication with a casting furnace in fluid communication with a pump for supplying molten magnesium to a die casting machine that produces solid castings and solid scrap, the solid scrap re-introduced into the re-melt furnace.
7. The magnesium die casting system of claim 6, wherein the re-melt furnace does not use flux.
8. The magnesium die casting system of claim 6, wherein the re-melt furnace includes a plurality of heating zones that may be independently controlled.
9. The magnesium die casting system of claim 8, wherein each heating zone includes one or more heating elements.
10. The magnesium die casting system of claim 9, wherein each heating zone comprises a heat transfer material and wherein a different material is used in one or more zones.
11. The magnesium die casting system of claim 10, wherein the heating elements are located adjacent the heat transfer material.

12. The magnesium die casting system of claim 6, wherein the re-melt furnace has a plurality of temperature sensors located at a plurality of positions within the furnace.

13. The magnesium die casting system of claim 12, wherein the temperature sensors are located within different regions within the re-melt furnace.

14. The magnesium die casting system of claim 6, wherein the re-melt furnace is in fluid communication with the casting furnace through a U-shaped tube.

15. The magnesium die casting system of claim 14, wherein the U-shaped tube functions by siphoning.

16. The magnesium die casting system of claim 14, wherein the U-shaped tube is heated.

17. The magnesium die casting system of claim 14, wherein the U-shaped tube comprises a filter.

18. The magnesium die casting system of claim 6, wherein the re-melt furnace comprises a crucible and wherein the crucible is shaped to promote stratification within the crucible.

19. The magnesium die casting system of claim 18, wherein the crucible includes one or more baffles.

20. The magnesium die casting system of claim 19, wherein the baffle or baffles is/are removable.